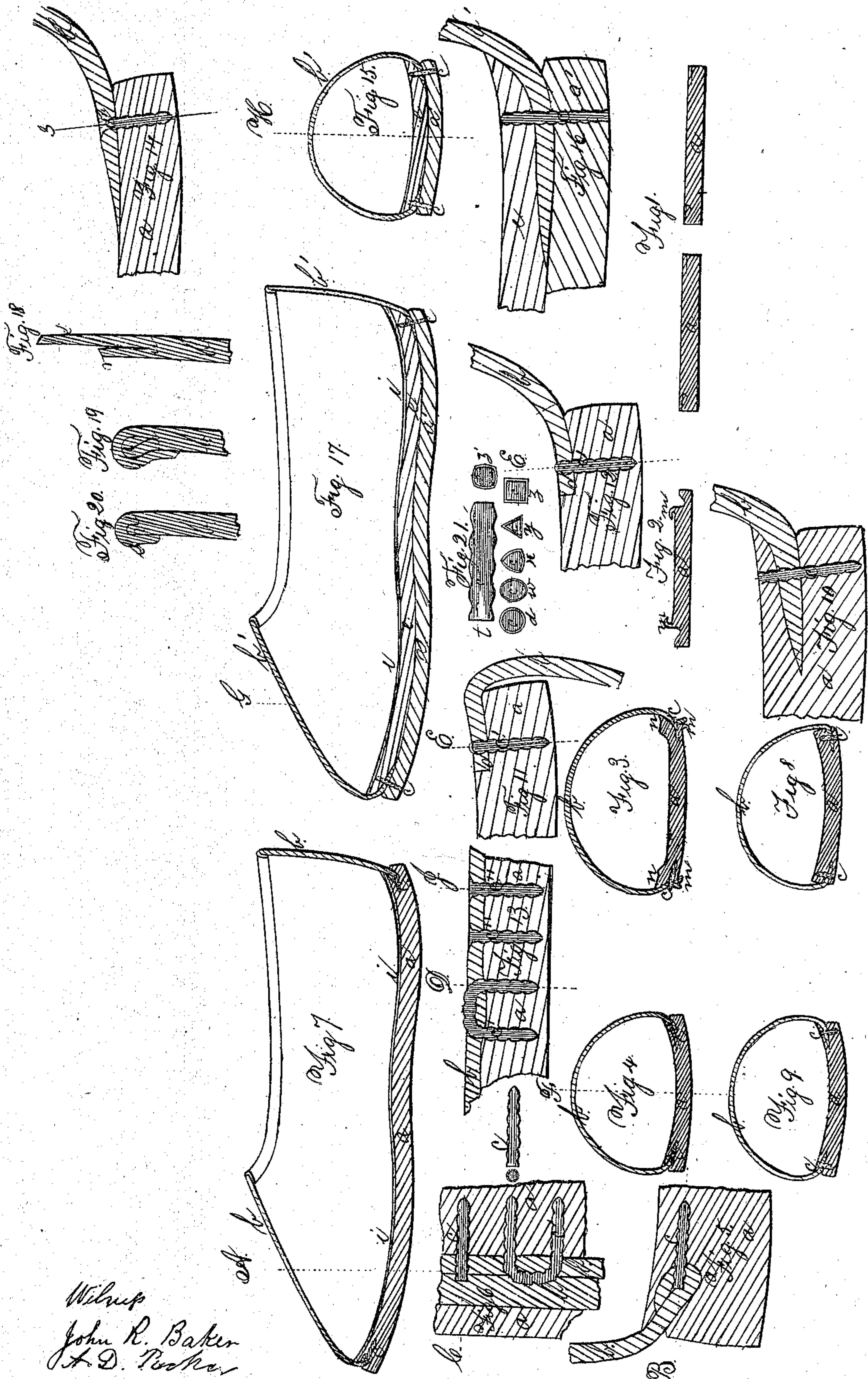


W. WICKERSHAM.
BOOT AND SHOE.

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IMPROVEMENT IN BOOTS AND SHOES.

The Schedule referred to in these Letters Patent and making part of the same.

I, WILLIAM WICKERSHAM, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain Improvements in Boots and Shoes, of which the following is a specification.

Nature and Objects of the Invention.

The first part of my invention relates to turn shoes; that is, that class of shoes and boots which have their upper part attached to the sole while wrong side out, afterward to be turned and finished, and consists in a turn-shoe or boot as an article of manufacture, having the upper-leather of said shoe or boot attached to the side thereof by means of metallic fastening, as will be more fully shown by a reference to the drawing.

Referring to my drawing—

Figure 1 shows two cross-sections of the sole, with spaces cut in their edges for the lower edge of the upper-leather.

Figure 2 is a cross-section of the sole, with said spaces opened on the upper side.

Figure 3 shows the same with the spaces opened both ways, having the upper-leather in its place and secured there by the insertion of wires, yet wrong side out.

Figure 4 is the same after it has been turned and the proper form has been given to the sole on the last, and is a section of the shoe in the dotted line A.

Figure 5 is one side of the same on a larger scale in the dotted line C, showing more clearly the manner in which the wire secures the upper to the sole, and the form of the lower edge of the upper.

Figure 6 is a horizontal section in the dotted line B, showing two forms in which the wire may be made, which secures the upper to the sole, one in the form of a staple, having its two points pass through the upper and into the sole, while the middle part binds the upper against the sole; and the other form is a straight wire with a succession of larger and smaller diameters. It also shows a longitudinal and cross-section of the wire.

Figure 7 shows a longitudinal and perpendicular section of a shoe in the dotted line F, after having been turned right side out and completed, with a lining placed in the bottom.

Figure 8 is a cross-section of a shoe before turning, in which the upper is secured to the sole in a different way.

Figure 9 shows the same after it has been turned, and the sole properly formed on a last.

Figure 10 is one side of fig. 9 on a large scale.

Figure 11 is a cross and perpendicular section of one side of a shoe before turning, taken in the dotted line D, showing a method of attaching the upper part of the shoe to the upper surface of the sole, after a

shallow channel has been cut to receive it, the staple form of the wire being used.

Figure 12 is the same after it has been turned right side out.

Figure 13 is a longitudinal and perpendicular section on the dotted line E, showing the staple-form of the wire, and also, a straight wire with a small head, and their manner of securing the upper to the sole.

Figure 14 shows still another variation, using the headed wire, in which there is no channel cut in the sole for the reception of the upper, said upper being skived off to a thin edge inside of the wire-fastening, as taken in the dotted line J.

Figure 15 is a perpendicular section in the dotted line G, showing a boot or shoe, with two soles, which is not turned, the lower edge of the upper-leather being inserted between the two soles, and the wires driven in from the outside through the out-sole, the upper-leather, and into the sole while the shoe is on the last.

Figure 17 is a longitudinal section of the same in the dotted line H, showing the shoe as finished, with a lining on the upper side of the inner sole.

Figure 21 shows various cross-sections of my wire C or C', though I do not limit myself to any form in cross-section, provided that in its longitudinal sections its prominent portions are rounded, as at *t*, cross-sections as at *d w x y z z'*.

a is the sole of the turn-shoe.

b is the upper part or upper-leather of the same.

b' is the upper of the shoe not turned.

c is the straight wire by which the upper part is attached to the sole.

c' is the wire bent in the form of a staple for the same purpose.

c'' is the wire tack or nail, with a small head on the end.

a' is the out-sole of the boot or shoe, not turned.

i is the lining, which is commonly pasted onto the sole inside of most shoes and boots.

Having described the drawing, I will more fully explain the construction and advantages of my boot and shoe manufacture.

The first part of the process is to cut out the soles and uppers in the proper form, (and in case of boots to crimp them,) and then close them very much as boots and shoes are ordinarily closed; then the soles for the turn-shoe are grooved, as shown in fig. 1, by having a cut made in from the edge near to the upper surface, and dipping downward a little, and then from the lower part of that cut having a small portion of the leather taken out all the way round the sole, leaving a little semi-circular space for the loop of the lower edge of the upper-leather to rest in. Said spaces are shown in fig. 1, but more plainly in fig. 5,

where the loop or fold of the lower edge of the upper-leather *b* is represented in said groove or space.

Next step in the process is, to bend upward the thin portions of leather above the said cut, as shown in fig. 2, at *m m*.

Next, the thick portion of the leather at the other side of the cut is bent back from the said cut, as shown at *n n*, fig. 3.

Next part of the process is to place the lower edge of the upper-leather into the groove thus opened, and insert portions of the metallic wire or tacks or nails or whatever form of metallic fastening may be found most convenient and efficient, through the upper-leather into the sole, as shown at *c c*, fig. 3, where it will be seen that the sole is reversed from its position in fig. 2, and the shoe thus put together is wrong side out. While this last-named process is going on, the shoe is put onto a last the right shape to suit or fit the shoe while in this position, and the parts of the sole at *m m* are straightened.

The next step in the process is to turn the shoe right side out, after which it is placed on a last of suitable form for the interior of the shoe when completed. Then the edge of the sole at *n n* is bent back, as near as may be, to its original position, and the shoe is finished, as shown at fig. 4, which is a cross-section of the shoe in the dotted line A, except that it does not show the lining *i*, which is pasted in after the last is taken out.

By this method, the upper-leather is attached to the sole in a firm and durable manner, as will be apparent by an examination of fig. 5, where it will be seen that the wire *c* passes through the upper-leather *b* near the edge, (as also seen at *c*, fig. 3,) and then afterward a portion of said upper-leather outside of the place where the wire passes through it, folds against the outer end of said wire, thereby preventing any possibility of its receding from its position, even if it was a smooth wire, and the portion of the upper which thus secures the wire in its place is kept firm and secure by the portion of the sole which rests against the outside of it, and this, as it dries, becomes hard and rigid, causing the upper and the wire mutually and permanently to lock each other in their places.

Fig. 6 illustrates this still further in a horizontal section in the dotted line B, where the staple form of wire *c'* is shown, together with the wire *c*, in their horizontal relations to the upper and the sole.

The wire *c'* is also shown in figs. 11, 12, and 13. It is, in some cases, of great advantage. It secures a greater length of the upper-leather than two single wires would do in case the sole and upper are applied to each other as shown in figs. 5 and 6, and its advantages are still more important where the uppers are applied as in figs. 11, 12, 13, and 14, where the upper is secured to the upper side of the sole either with or without a groove, as in figs. 12 or 14.

Another advantage of this staple form of wire is, that it is equal, at least, to two single wires, and whether driven by hand or machinery, can be driven in the same time as a single wire, thereby enabling the operator to do twice as much work in the same time.

The wire *c''* may be substituted for this staple wire for fastening the upper of a turn-shoe when placed directly on the upper side of the sole, as shown in figs. 13 and 14. But for reasons previously given favorable to the wire *c'*, I consider it preferable to the headed wire.

Another form of applying the upper-leather of the shoe to the sole, is shown in figs. 8, 9, and 10. In this, a cut is made all the way round in the edge of the sole near the upper surface, into which the lower

edge of the upper-leather is inserted, after which the wires *c c* are driven in through the upper part of the sole *a*, through the upper-leather *b*, and into the lower and thicker part of the sole, as shown at fig. 8, which is a cross-section of the shoe before trimming. The same is represented in fig. 9, after it has been turned, and its form completed on a last.

This manner of attaching the upper *b* to the sole *a*, and securing it by the wire *c*, is shown more plainly on a large scale at fig. 10.

I have still another method of attaching the upper-leather to the sole of a turn-shoe, shown in figs. 11 and 12, which are cross-sections of one side of the same in the dotted line D, and further shown in fig. 13, which is a longitudinal section in the dotted lines E E, which also shows the wires *c'' c''*, which may be substituted for the staple wire *c'*.

As shown in those sections, I cut out of the upper side of the sole, around its edge, a shallow groove or space at *o*, sufficient in depth at the inner part, or nearly so, for the thickness of the upper-leather. I then place the lower edge of the upper-leather in this space, and insert the wires *c'* or *c''* through the upper-leather and into the sole, as shown in figs. 11, 12, and 13. The shoe before it is turned is represented in fig. 11, and after it is turned in fig. 12.

The advantages of this method are obviously these: A neater finish can be made by having the groove equal in depth to the thickness of the upper, where it joins the sole, making the surface of the upper and sole even on the top, while, in case of skiving the upper where it joins the sole, the skived part is inclined to the surface of the sole, making the bottom of the shoe uneven or irregular, and unpleasant to the foot, and further, the thin edge of the skived part is liable to turn up while in use, beside, when the square edge of the upper is fitted into the groove *o*, as described, the fastening can be closer to the edge than when it is skived, thereby requiring less upper-leather, and therefore less cast for the shoe, as the skived part is as good as wasted. Besides, the cost of trimming and skiving the upper is greater than grooving the sole and turning the upper, as skiving the soft upper is delicate and tedious work.

I have still another method of attaching the upper to the sole of a turn-shoe, shown on a large scale in a perpendicular and cross-section in fig. 14, in which the lower edge of the upper-leather is placed on the top of the sole, without any space or channel being cut, so that the full thickness of the sole-leather lies underneath the upper-leather in the line of attachment, said upper-leather being tapered off to a thin edge inside of said line, as is clearly shown in the drawing, fig. 14. Either the wire *c'* or *c''* may be used in this case, as will appear obvious by referring to the drawing at fig. 13, part of which may be considered a section in the dotted line I, and fig. 14 in the line J.

In constructing this turn-shoe, I place the sole on the bottom of the last, and secure it by tacks, then place the upper on the last wrong side out, and insert the wires *c'* or *c''*, then take it off of the last, turn it, put it onto another suitable last, and finish it.

This method of attaching the sole to a turn-shoe has the advantage of extreme simplicity of construction, and the further advantage of the full thickness of the sole-leather to wear through before the shoe is worn out, no grooves or channels being cut into it, and though I think it has sufficient strength for all wearing purposes, it may not have so much as that shown in fig. 5.

A lining, *i*, is pasted onto the bottom inside, covering the sole and the part of the upper which projects over the sole.

Fig. 15 is a cross section of a shoe or boot with two

soles, not to be turned, taken in the dotted line G, which I construct in the following manner:

First, I place the insole *e* on the bottom of the last, then I place the upper-leather *b* properly on the last, folding the lower edge over the in-sole; then I place the out-sole *a'* properly onto the in-sole, inclosing the lower edge of the upper between the two soles. I then insert the indented wires *c c* all around and near the edge of the sole in such manner as to have them pass through the out-sole, the part of the upper-leather between the two soles, and into the in-sole *e*, as shown in fig. 15, but more plainly in fig. 16, which is a cross-section of a part of the shoe in the dotted line G, and especially the form of the wire *c* is more perfectly shown in this figure.

Fig. 17 is a longitudinal section of the finished shoe taken in the dotted line H.

In this shoe, which I make without turning, the staple form of the wire may be used if desired, but the other form of wire, *c*, would probably be preferred.

This wire *c*, which I use exclusively in this last-mentioned, (double-soled,) boot or shoe, has great advantage over other forms of wire used for a similar purpose, as its prominent portions, or those of the larger diameter are rounded, so as to enable them to pass easily and smoothly into the leather, without mangling or grinding its fibres into powder, as sharp edges or angular points do, but they compress the leather in their passage through it, leaving it in a condition to contract into the grooves, close around the wire at its smaller diameters when relieved of said pressure, and while said leather is in a damp and partially plastic state, so that when the leather dries and becomes hard and rigid, having contracted closely into the indented portions, as well as onto the prominent portions of the wire, will thereby give this wire an efficient holding-power, for securing permanently and durably the different parts of the boot or shoe together.

Too much can hardly be said in favor of the metallic fastening to secure the upper to the soles of boots and shoes, and I am led to believe that, when the best method of applying the upper to the sole, and the best form of wire for attaching them, and the best machinery shall be devised for putting them together, it will not be long until the metallic method will be the universal method, and when that takes place, a great progressive step in this branch of manufacture will have been achieved.

At Figures 18, 19, and 20, are illustrations of a new method of binding the upper edge of the upper-leather of shoes, boots, &c., which is done by splitting the leather from the upper edge downward to the position *u*, then cutting off the part *r* to the position *r*, fig. 18; then the upper end of the part *r* is bent into the slit and brought down to the position *u*, and the part *s* is bent over toward the inside of the shoe around the part *r* thus folded, so that the upper end will lie close against the inside of the shoe, as shown in cross-section, fig. 19.

Another and simpler plan is shown in cross-section, fig. 20, in which the leather is slit down only half the distance, as shown in fig. 19, to the point *v*, and the inside part is cut off as low as the split, then the outside part *s'* is bent over the other, and extends down against the inside of the shoe, as shown in fig. 20.

These methods of binding, so simple and so beautiful in finish, can be effected by a very simple instrument, reducing very much the cost of binding, at the same time improving its quality.

The instrument for cutting and folding can be attached to a sewing-machine, producing the binding as fast as it can be sewed, or it can be cut and folded

by the instrument, and at the same time cemented by India rubber or other cement, and in case there is lining on the inside of the work, the outside part of the leather *s* or *s'* can be folded onto the lining and secure it in the binding.

I do not confine myself to shoes or boots made entirely of leather, as many kinds of material are used for the upper part of boots and shoes, and probably other material will hereafter be used, so that when I have used the words "upper-leather," or "upper," I mean the upper part of the boot or shoe, in contradistinction to the sole.

For hundreds of years, boots and shoes were put together almost exclusively by sewing, and by that method I have known good boot-makers, who thoroughly understood their business, to work a whole day on a single pair of boots.

The use of wooden pegs may, perhaps, be considered the next step of progress in the manufacture, so far as diminution of cost is concerned, but the work is not so satisfactory.

The cost of this method was still diminished very much by the use of machinery. The first great progressive step in this branch of manufacture, where the work was sewed together, was by the introduction of the wax thread sewing-machine, which has been applied to closing the uppers and then sewing on the soles, and this reduced the labor cost of making boots and shoes to about one-tenth of that of making them altogether by hand; that is, one hand by the use of the wax thread sewing-machine, and other improved facilities, can make ten first class pairs of boots per day, while without the use of machinery he can only make one pair.

By my method, by the use of metallic fastening and suitable machinery to do the work, one hand can make and complete one pair of first-class shoes in ten minutes, and one pair of first-class boots in twenty minutes, which will be equal in every respect to the best sewed work.

There is nothing in this method to prevent the full elasticity of the sole, which is found in sewed work, a want of which is complained of in pegged work.

My form of wire has much greater holding power than the threads of sewed work, after they have been worn off on the bottom of the sole, which usually takes place a few days after the wearer begins to use them, and on account of their greater holding power, so many are not necessary to make the same strength, or if the same number of wires are placed in the sole, as there are of stitches in sewed work, it will be stronger, and, at the same time, the wires are smaller than the stitches.

Having thus described my invention,
I claim—

1. A process of attaching the sole to the upper of boots and shoes, by first cutting an opening in the edge of the sole; second, by separating the two parts thus cut, and applying the upper to the opening; third, by attaching the upper to the sole in said opening, by inserting wires, substantially as shown and described, and for the purpose set forth.

2. A turn-shoe or boot in which the space for the part of the upper material *b*, which is attached to the sole, is cut into the outer edge of the sole with its inner part enlarged, into which enlarged part is placed the doubled or folded edge of the upper material, substantially as shown in figs. 1 and 5, as and for the purpose set forth.

3. A turn-shoe or boot in which there is a shallow groove or channel cut out of the upper surface of the sole around its edge, for the reception of the edge of the upper material *b* to be attached to the said sole, substantially as shown in figs. 11, 12, and

13, with a metallic fastening agent *c'* or *c''*, in the manner and for the purpose set forth.

4. A binding for shoes boots, &c., which consists in splitting the edge of the leather to a convenient distance, trimming off the inside half, and folding the remainder into the split, then folding the outer half entirely over the inner half, and attaching its edge to the inside of the leather by sewing, substantially as shown and described and for the purpose set forth.

5. A binding for shoes, boots, &c., which consists

of a split being made in the edge of the leather, and the inside part cut off, and then folding the outside part over onto the inside of the leather, and attaching it thereto either by sewing or cement, substantially as shown, as described and for the purpose set forth.

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Witnesses:

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